NAVAL
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Human Systems Integration

White Paper for SPAWAR

October 16, 2003

The Naval Postgraduate School (NPS) has a cadre of faculty members experienced in various aspects of Human Systems Integration (HSI). These individuals are distributed among several departments and organizations, including Operations Research, MOVES (Modeling, Virtual Environments and Simulation), Systems Engineering, the C4ISR Group, the Business School, and the School of Aviation Safety. The combination of these resources covers nearly the entire gamut of HSI components:

- Human Factors Engineering
- Personnel
- Habitability
- Manpower
- Training
- Environment, Safety, & Health (ESH)
- Survivability

In addition to teaching, faculty members at NPS are encouraged to participate in research and applications of knowledge within the Department of Defense and other Government agencies. The HSI-related faculty members are capable and willing to work with SPAWAR in organizing and implementing the new DoD 5000.2 Acquisition Directive (Enclosure 7), which mandates that all DoD Program Managers develop a plan for HSI early in the acquisition process. Without sufficient background and experience in HSI, this requirement may appear daunting. The HSI-related faculty at NPS stands ready to support SPAWAR management in developing the methods and procedures for implementing an HSII program. NPS input could be provided in several areas:

1. HSI Program Planning support. NPS HSI personnel are prepared to work with an HSI Manager or Team at the outset of a program to develop a Plan identifying HSI milestones, timeline, and resources.

2. Assess the "Health" of an ongoing program with respect to HSI. NPS faculty can assess the efforts that have been applied at various stages in the acquisition and development process. The assessment processes can be accomplished both on-site at SPAWAR and at NPS. The latter case would

involve the critical analysis of key documentation. NPS personnel can identify strengths and weaknesses of HSI development, test, evaluation, and compliance for an ongoing program development and make recommendations for improvement.   The earlier in the process that such evaluations can be made, the more cost-effective is the input.

3. HSI Training for Program Managers and Project Engineers. NPS HSI personnel are prepared to develop and deliver periodic training sessions oriented at appropriate levels, such as Program Managers, Systems Engineers, or user interface developers.   The training programs could be delivered either in-person at SPAWAR, or via the NPS Video Tele Education (VTE) studios, or both. NPS faculty teach these subjects regularly and can tailor the content to specific learning objectives appropriate for SPAWAR system development.

4. Screen and certify qualified HSI experts. NPS HSI personnel can support SPAWAR in developing criteria for screening qualified people to participate in ongoing HSI analyses. Historically, the field of HSI experienced a similar challenge in the nuclear power industry after Three Mile Island. The demand for Human Factors analysts exceeded the supply and a large number of unqualified individuals rushed-in to provide "expert" analysis of control room layout and procedures. Establishing objective screening criteria is the recommended approach to finding qualified personnel to execute SPAWAR HSI programs.

A partial list of NPS HSI Personnel follows:

     Nita Lewis Miller, Ph.D.
     Michael E. McCauley, Ph.D.
     Rudy L. Darken, Ph.D.
     Anthony Ciavarelli, Ed.D.
     J. Jeffrey Crowson, Ph.D.
     Stephen Mehay, Ph.D.
     Alice Crawford, M.A.
     Susan Hutchins, M.A.
     CDR Andrew Belenkes
     LCDR Laura Barton

Labor costs for NPS personnel, fully burdened, reach $117 per hour maximum. Several of the personnel are less. Travel from Monterey to San Diego, plus lodging, at Government rates would be additional to the personnel labor costs.

Further discussion with SPAWAR would be necessary to scope approximate labor hours by month to develop a more detailed cost estimate.